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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT PAPER NUMBER

1774

DATE MAILED: 11/30/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.  
09/729,195

Applicant(s)  
Hitoshi ISHIKAWA et al.

Examiner  
M. Yamnitzky

Art Unit  
1774

- The MAILING DATE of this communication appears on the cover sheet with the correspondence address -

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three (3) MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a) ☒ All b) ☐ Some\* c) ☐ None of:

- ☒ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-848) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 2 20) ☐ Other:

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1. Receipt of formal drawings, filed 03/21/01, is acknowledged.
2. Claims 2, 5, 10, 11, 18 and 19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2: Antecedent basis for "said hydrocarbon group" is unclear. Claim 1 requires one of  $Ar_2$  to  $Ar_5$  to comprise at least one hydrocarbon group which may include oxygen atom(s). Claim 1 also recites "substituted or unsubstituted aromatic hydrocarbon group" as a possibility for each of  $R_1$  to  $R_{11}$ . It is not clear if claim 2 is broadly requiring  $R_6$  to be the hydrocarbon group that one of  $Ar_2$  to  $Ar_5$  comprises, or specifically requiring  $R_6$  to be a substituted or unsubstituted aromatic hydrocarbon group.

Claim 5: The phrase "bonded to at least one of carbon atom directly bonded to a carbon atom bonded to a nitrogen atom, in said aryl group" is confusing. It is not clear what is meant by this phrase. Is the aryl group required to comprise a nitrogen atom, or does "a nitrogen atom" refer to one of the nitrogens shown in formula [2.1]? Is this language placing a limit on the number of carbons between the nitrogen atom and the attachment point of the saturated hydrocarbon group to the aryl group?

Claims 10 and 18 require at least a hole transporting layer containing a compound of general formula [2.1] and [3.1], respectively. Claims 3 and 14 require one or more organic thin film layers including a luminescent layer, characterized in that the luminescent layer comprises a

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compound of formula [2.1] and [3.1], respectively. It is not clear if the hole transporting layer of claims 10 and 18 can also function as the luminescent layer required by claims 3 and 14, respectively, or if the hole transporting layer of these dependent claims must be in addition to the luminescent layer of the independent claims.

Claims 11 and 19 require at least an electron transporting layer containing a compound of general formula [2.1] and [3.1], respectively. Claims 3 and 14 require one or more organic thin film layers including a luminescent layer, characterized in that the luminescent layer comprises a compound of formula [2.1] and [3.1], respectively. It is not clear if the electron transporting layer of claims 11 and 19 can also function as the luminescent layer required by claims 3 and 14, respectively, or if the electron transporting layer of these dependent claims must be in addition to the luminescent layer of the independent claims.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by any one of JP 11-74079 or JP 11-185961 or JP 11-297473.

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In JP 11-74079, see the abstract and the first formula on page 14 through the second formula on page 18. Each of the compounds represented by these formulae meets the limitations of a compound of formula [1.1] as required by claim 1.

In JP 11-185961, see the abstract and the last formula on page 10. The compound represented by the last formula on page 10 meets the limitations of a compound of formula [1.1] as required by claim 1.

In JP 11-297473, see the abstract and the second formula on page 12. The compound represented by the second formula on page 12 meets the limitations of a compound of formula [1.1] as required by claim 1.

5. Claims 1-4, 6, 10-16 and 18-21 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 9-268284.

(A translation of JP 9-268284, submitted to the Office during prosecution of a copending application having four inventors in common with the present application, is provided with this Office action. The page numbers referred to in this rejection are the page numbers found in the lower right corner of the translation pages. Note that the first page of the translation is page 2.)

See the whole document. In particular, see the abstract (pages 2-3), the compounds on pages 14-24, the description from the top of page 38 through the third line of page 39, and the device examples which begin on page 46.

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Each of prior art compounds (1)-(24), (28), (33)-(38) and (44)-(52) meets the limitations of a compound of formula [1.1] as required by claim 1. Of these compounds, each of compounds (48)-(52) meets the additional limitation set forth in claim 2 regardless of whether claim 2 is interpreted as broadly requiring  $R_6$  to be the hydrocarbon group that one of  $Ar_1$  to  $Ar_5$  comprises, or specifically requiring  $R_6$  to be a substituted or unsubstituted aromatic hydrocarbon group.

Each of prior art compounds (12), (13) and (17) meets the limitations of a compound of formula [2.1] as required by claims 3 and 13. Of these compounds, compound (13) meets the additional limitations set forth in claims 4 and 6.

Each of prior art compounds (48)-(52) meets the limitations of a compound of formula [3.2] as required by claims 14 and 21, and the additional limitations set forth in claims 15 and 16.

Claims 10, 11, 18 and 19 are included in this rejection subject to clarification as to whether the hole transporting layer of claims 10 and 18, and the electron transporting layer of claims 11 and 19, can also function as the luminescent layer required by the independent claims from which these claims depend. If so, these claims are anticipated by the prior art.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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7. Claims 5, 7-11 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 9-268284 as applied to claims 1-4, 6, 10-16 and 18-21 above, and for the further reasons set forth below.

With respect to claim 5, the limitations of this claim are unclear. Interpreting claim 5 as requiring a saturated hydrocarbon group bonded to a carbon of an aryl group, the aryl group being directly bonded to one of the nitrogens shown in formula [2.1], with the aryl group having only one carbon in the "chain" (examiner's terminology) between the carbon to which the saturated hydrocarbon group is bonded and the carbon to which the nitrogen is bonded (e.g. a meta bond position in the case where the aryl group is a phenyl group), the prior art does not disclose a specific compound meeting the limitations of claim 5. However, such a compound is within the scope of the prior art and compound (13) is a position isomer of such a compound (compound (13) having an n-butyl substituent at the para-position instead of the meta-position on each of two aryl groups that are not styryl groups).

The prior art also does not disclose any specific examples of compounds meeting the limitations of claims 7-9 or 17, but such compounds are within the scope of the prior art. For example, the prior art teaches that  $R^4$ , which corresponds in position to  $R_6$  of the present claims, can be a substituted or unsubstituted alkyl group (e.g. see page 3). Exemplary alkyl groups are disclosed on page 12. The prior art also teaches that one or more of  $X^1-X^4$  can be a substituted arylene group, and Z can be a substituted aryl group (page 3). As taught on page 13, the aryl group represented by Z can be substituted with an alkyl group such as the alkyl groups suitable

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for R<sup>4</sup>. Various of the exemplary alkyl groups are saturated hydrocarbon groups having two or more carbon atoms. Although the prior art does not name possible substituents for the arylene group represented by X<sup>1</sup>-X<sup>4</sup>, one of ordinary skill in the art would reasonably expect that substituents suitable for the aryl group represented by Z would also be suitable for the arylene group represented by X<sup>1</sup>-X<sup>4</sup>.

Although the prior art does not disclose any specific examples of compounds meeting the limitations of claims 5, 7-9 and 17 (with claim 5 subject to interpretation), such compounds are within the scope of the prior art. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make compounds within the scope of the generic formula disclosed by the prior art, to make compounds that are similar to the specific compounds disclosed in the prior art, and to use those compounds for the purpose taught by the prior art. One of ordinary skill in the art at the time of the invention would have been motivated to make other compounds within the scope of the prior art, and compounds similar to those disclosed by the prior art, with the expectation that compounds similar in structure will have similar properties and can be used for the purpose taught by the prior art. See *In re Payne*, 606 F.2d 303, 313, 203 USPQ 245, 254 (CCPA 1979). Also see *In re Wilder*, 563 F.2d 457, 195 USPQ 426 (CCPA 1977).

With respect to claims 10, 11, 18 and 19, if these claims are to be interpreted as requiring two separate layers comprising the specified compound, it is the examiner's position that devices having the required structure/composition would have been obvious to one of ordinary skill in the



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art at the time of the invention given that the prior art teaches that the compounds have high positive hole transportability and electron transportability as well as having high luminous quantum efficiency. Based on the prior art teachings of the properties of the compounds, it would have been an obvious modification to one of ordinary skill in the art at the time of the invention to utilize the compounds in a hole transporting layer or an electron transporting layer of an electroluminescent device in addition to utilizing the compounds in the luminescent layer of the device. One of ordinary skill in the art would have been motivated to do so based on the prior art teachings that the compounds have properties that are desirable for these layers.

8. Miscellaneous:

Claims 1, 3, 13, 14 and 21 are not written in the proper, single sentence, format. Claims 1, 3, 13, 14 and 21 must be rewritten in the form of a single sentence.

Claims 1, 3, 13, 14 and 21 include the term "hydroxyl" (second line after formula [1.2] , [2.2] and [3.2]). The examiner suggests that this term be changed to --hydroxy-- since, technically, "hydroxy" refers to the -OH group in an organic compounds whereas "hydroxyl" refers to the -OH group in inorganic compounds.

In line 4 of claims 1, 3 and 14, "layer" should be changed to --layer(s)-- for consistency in claim language.

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9. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (703) 308-4413. The examiner works a flexible schedule but can generally be reached at this number from 6:30 a.m. to 4:00 p.m. Monday, Tuesday, Thursday and Friday, and every other Wednesday from 6:30 a.m. to 3:00 p.m.

The current fax numbers for Art Unit 1774 are (703) 872-9311 for official after final faxes and (703) 872-9310 or (703) 305-5408 for all other official faxes. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (703) 872-9041.)

MRY  
11/29/01

*Marie R. Yamnitzky*

MARIE YAMNITZKY  
PRIMARY EXAMINER

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